

MATHEMATICS SEMINAR
of the
UNIVERSITY OF LUXEMBOURG
in cooperation with the
LUXEMBOURG MATHEMATICAL SOCIETY

June 2010

1 June 2010, at 5 pm

Room B.02

Jean-Louis Tu
Paul Verlaine University, Metz

~~TBA~~ The Baum-Connes and the coarse Baum-Connes conjecture

Let G be a locally compact group. The Baum-Connes conjecture allows to compute the K -theory group of the reduced C^* -algebra of G . It is related to many domains of mathematics such as differential geometry, index theory, harmonic analysis and geometry of groups. We will present a survey of some past and recent developments on this subject.

15 June 2010, at 5 pm

Room B.02

Vincenzo Nesi
University of Rome 1, La Sapienza

Planar harmonic maps

Abstract

A planar harmonic mapping $U = (u^1, u^2)$ on the unit disk $B \subset \mathbb{R}^2$ is simply a pair of harmonic functions on B . The theme of the talk is establishing conditions under which U is a global homeomorphism.

Given a homeomorphism Φ of ∂B onto a simple closed Jordan curve γ , set D to be the simply connected bounded open set determined by γ . A classical result of H. Kneser (1926) establishes that, if D is convex, the harmonic extension of Φ is a homeomorphism of \bar{B} onto $\bar{D} \equiv \gamma \cup D$.

I will then present the main result. If $\Phi \in C^{1,\alpha}(\partial B)$, then we give a necessary and sufficient condition for U to be a diffeomorphism of \bar{B} onto \bar{D} so providing a sharp version of H. Kneser's Theorem. Finally, if time permits, I will present versions of Kneser's theorem which are valid when considering L^∞ elliptic operators rather than the Laplace operator with applications to composite materials. The talk is based upon a joint work with Giovanni Alessandrini, Università degli Studi di Trieste.